

Title (en)  
SYSTEMS AND METHODS FOR NULLIFYING ENERGY LEVELS FOR WIRELESS POWER TRANSMISSION WAVES

Title (de)  
SYSTEME UND VERFAHREN ZUR ANNULIERUNG VON ENERGIELEVELS FÜR WELLEN ZUR DRAHTLOSEN STROMÜBERTRAGUNG

Title (fr)  
SYSTÈMES ET PROCÉDÉS POUR ANNULATION DES NIVEAUX D'ÉNERGIE DES ONDES DE TRANSMISSION DE PUISSANCE SANS FIL

Publication  
**EP 3404801 A1 20181121 (EN)**

Application  
**EP 18173531 A 20160915**

Priority  
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• EP 16189052 A 20160915

Abstract (en)  
Embodiments disclosed herein may generate and transmit power waves that, as result of their physical waveform characteristics (e.g., frequency, amplitude, phase, gain, direction), converge at a predetermined location in a transmission field to generate a pocket of energy. Receivers associated with an electronic device being powered by the wireless charging system, may extract energy from these pockets of energy and then convert that energy into usable electric power for the electronic device associated with a receiver. The pockets of energy may manifest as a three-dimensional field (e.g., transmission field) where energy may be harvested by a receiver positioned within or nearby the pocket of energy.

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Citation (applicant)  
• US 201413891445 A  
• US 201414584364 A 20141229

Citation (search report)  
• [A] US 2014008993 A1 20140109 - LEABMAN MICHAEL A [US]  
• [A] US 2014375255 A1 20141225 - LEABMAN MICHAEL A [US], et al  
• [A] US 2010315045 A1 20101216 - ZEINE HATEM [US]  
• [A] US 2012326660 A1 20121227 - LU MINGYU [US], et al  
• [A] US 2010033021 A1 20100211 - BENNETT JAMES D [CZ]  
• [A] US 6967462 B1 20051122 - LANDIS GEOFFREY A [US]  
• [A] US 2010079005 A1 20100401 - HYDE RODERICK A [US], et al

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**EP 3145052 A1 20170322; EP 3145052 B1 20190717**; CN 107017707 A 20170804; CN 107017707 B 20220304; CN 114530947 A 20220524; EP 3382854 A1 20181003; EP 3382854 B1 20191030; EP 3386073 A1 20181010; EP 3386073 B1 20191030; EP 3404801 A1 20181121; EP 3404801 B1 20200311; EP 3460953 A1 20190327; EP 3460953 B1 20210414; EP 3462576 A1 20190403; EP 3462576 B1 20200826; EP 3849051 A1 20210714; KR 20170033796 A 20170327; TW 201728101 A 20170801; TW 202112080 A 20210316; TW I703832 B 20200901; TW I779323 B 20221001; US 2017077995 A1 20170316; US 9906275 B2 20180227

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